

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously presented): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a laser beam to crystallize said semiconductor layer; and

forming source, drain and channel region of said thin film transistor within said semiconductor layer,

wherein said laser beam is a second harmonic component having a wavelength of 532 nm generated from a continuous-oscillate light source,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

2. (Previously presented): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a linear laser beam to crystallize said semiconductor layer; and

forming source, drain and channel region of said thin film transistor within said semiconductor layer,

wherein said linear laser beam is a second harmonic component having a wavelength of 532 nm generated from a continuous-oscillate light source,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said linear laser beam in parallel with a carrier flow direction in said channel region.

3. (Withdrawn): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a laser beam to crystallize said semiconductor layer; and

forming source, drain and channel region of said thin film transistor within said semiconductor layer,

wherein said laser beam is a third harmonic component generated from a continuous-oscillate light source,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

4. (Withdrawn): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a linear laser beam to crystallize said semiconductor layer; and

forming source, drain and channel region of said thin film transistor within said semiconductor layer,

wherein said linear laser beam is a third harmonic component generated from a continuous-oscillate light source,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said linear laser beam in parallel with a carrier flow direction in said channel region.

5. (Withdrawn): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

- forming a semiconductor layer over a substrate;
- irradiating said semiconductor layer with a laser beam to crystallize said semiconductor layer; and

- forming source, drain and channel region of said thin film transistor within said semiconductor layer,

- wherein said laser beam is a second harmonic component of a Nd:YAG laser,
- wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

6. (Withdrawn): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

- forming a semiconductor layer over a substrate;
- irradiating said semiconductor layer with a linear laser beam to crystallize said semiconductor layer; and

- forming source, drain and channel region of said thin film transistor within said semiconductor layer,

- wherein said linear laser beam is a second harmonic component of a Nd:YAG laser,
- wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said linear laser beam in parallel with a carrier flow direction in said channel region.

7. (Withdrawn): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

- forming a semiconductor layer over a substrate;
- irradiating said semiconductor layer with a laser beam to crystallize said semiconductor layer; and
- forming source, drain and channel region of said thin film transistor within said semiconductor layer,

wherein said laser beam is a third harmonic component of a Nd:YAG laser,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

8. (Withdrawn): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

- forming a semiconductor layer over a substrate;
- irradiating said semiconductor layer with a linear laser beam to crystallize said semiconductor layer; and
- forming source, drain and channel region of said thin film transistor within said semiconductor layer,

wherein said linear laser beam is a third harmonic component of a Nd:YAG laser,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said linear laser beam in parallel with a carrier flow direction in said channel region.

9. (Previously presented): A method of manufacturing a semiconductor device having at least one thin film transistor, said method comprising the steps of:

- forming a semiconductor layer over a substrate; and

irradiating said semiconductor layer with a linear laser beam to crystallize said semiconductor layer, while moving said substrate in a direction approximately perpendicular to a lengthy direction of said linear laser beam,

wherein said linear laser beam is a second harmonic component having a wavelength of 532 nm generated from a continuous-oscillate light source.

10. (Currently amended): A method of manufacturing a semiconductor device having at least one thin film transistor, said method comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a laser beam to crystallize said semiconductor layer; and

patterning the crystallized semiconductor layer to form an active layer of said thin film transistor[.]; and

forming source, drain and channel regions of said thin film transistor in said active layer,

wherein said laser beam is a second harmonic component having a wavelength of 532 nm generated from a continuous-oscillate light source[.], and

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a direction in which a carrier flows from said source region to said drain region.

11. (Withdrawn): A method of manufacturing a semiconductor device having at least one thin film transistor, said method comprising the steps of:

forming a semiconductor layer over a substrate; and

irradiating said semiconductor layer with a linear laser beam to crystallize said semiconductor layer, while moving said substrate in a direction approximately perpendicular to a lengthy direction of said linear laser beam,

wherein said linear laser beam is a third harmonic component generated from a continuous-oscillate light source.

12. (Withdrawn): A method of manufacturing a semiconductor device having at least one thin film transistor, said method comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a laser beam to crystallize said semiconductor layer; and

patterning the crystallized semiconductor layer to form an active layer of said thin film transistor,

wherein said laser beam is a third harmonic component generated from a continuous-oscillate light source.

13. (Withdrawn): A method of manufacturing a semiconductor device having at least one thin film transistor, said method comprising the steps of:

forming a semiconductor layer over a substrate; and

irradiating said semiconductor layer with a linear laser beam to crystallize said semiconductor layer, while moving said substrate in a direction approximately perpendicular to a lengthy direction of said linear laser beam,

wherein said linear laser beam is a second harmonic component of a Nd:YAG laser.

14. (Withdrawn): A method of manufacturing a semiconductor device having at least one thin film transistor, said method comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a laser beam to crystallize said semiconductor layer; and

patterning the crystallized semiconductor layer to form an active layer of said thin film transistor,

wherein said laser beam is a second harmonic component of a Nd:YAG laser.

15. (Withdrawn): A method of manufacturing a semiconductor device having at least one thin film transistor, said method comprising the steps of:

forming a semiconductor layer over a substrate; and

irradiating said semiconductor layer with a linear laser beam to crystallize said semiconductor layer, while moving said substrate in a direction approximately perpendicular to a lengthy direction of said linear laser beam,

wherein said linear laser beam is a third harmonic component of a Nd:YAG laser.

16. (Withdrawn): A method of manufacturing a semiconductor device having at least one thin film transistor, said method comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a laser beam to crystallize said semiconductor layer; and

patterning the crystallized semiconductor layer to form an active layer of said thin film transistor,

wherein said laser beam is a third harmonic component of a Nd:YAG laser.

17. (Previously presented): A method according to any one of claims 1, 2, 9 and 10, wherein said semiconductor layer comprises amorphous silicon.

18. (Previously presented): A method according to any one of claims 1, 2, 9 and 10, wherein said semiconductor layer comprises silicon and germanium.

19. (Previously presented): A method according to any one of claims 1, 2, 9 and 10, wherein the crystallized semiconductor layer contains carbon at a concentration not higher than  $5 \times 10^{18}$  atoms/cm<sup>3</sup>.

20. (Previously presented): A method according to any one of claims 1, 2, 9 and 10, wherein the crystallized semiconductor layer contains oxygen at a concentration not higher than  $5 \times 10^{19}$  atoms/cm<sup>3</sup>.

21. (Withdrawn): A method for manufacturing a semiconductor device, said method comprising the steps of:

- forming a semiconductor layer over a substrate;
- irradiating said semiconductor layer with a CW laser beam to crystallize said semiconductor layer; and
- patterning the crystallized semiconductor layer to form an active layer including a channel region,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

22. (Withdrawn): A method for manufacturing a semiconductor device having at least one thin film transistors, said method comprising the steps of:

- forming a semiconductor layer over a substrate;
- irradiating said semiconductor layer with a CW laser beam having a wavelength of 1064 nm to crystallize said semiconductor layer; and
- patterning the crystallized semiconductor layer to form an active layer including a channel region,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

23. (Withdrawn): A method for manufacturing a semiconductor comprising the steps of:



forming a semiconductor layer over a substrate;  
irradiating said semiconductor layer with a CW laser beam having a wavelength of 532 nm to crystallize said semiconductor layer; and  
patterning the crystallized semiconductor layer to form an active layer including a channel region,  
wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

24. (Withdrawn): A method for manufacturing a semiconductor device comprising the steps of:  
forming a semiconductor layer over a substrate;  
irradiating said semiconductor layer with a CW laser beam having a wavelength of 355 nm to crystallize said semiconductor layer; and  
patterning the crystallized semiconductor layer to form an active layer including a channel region,  
wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

25. (Withdrawn): A method for manufacturing a semiconductor device comprising the steps of:  
forming a semiconductor layer over a substrate;  
irradiating said semiconductor layer with a CW laser beam comprising Nd to crystallize said semiconductor layer; and  
patterning the crystallized semiconductor layer to form an active layer including a channel region,  
wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

26. (Withdrawn): A method for manufacturing a semiconductor device comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a second harmonic of a CW laser beam comprising Nd to crystallize said semiconductor layer; and

patterning the crystallized semiconductor layer to form an active layer including a channel region,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

27. (Withdrawn): A method for manufacturing a semiconductor device comprising the steps of:

forming a semiconductor layer over a substrate;

irradiating said semiconductor layer with a third harmonic of a CW laser beam comprising Nd to crystallize said semiconductor layer; and

patterning the crystallized semiconductor layer to form an active layer including a channel region,

wherein the irradiation of said semiconductor layer is conducted in such a manner that said semiconductor layer is scanned with said laser beam in parallel with a carrier flow direction in said channel region.

28. (Withdrawn): The method according to any one of claims 21, 22, 23, 24, 25, 26 or 27 wherein said semiconductor layer comprises amorphous silicon.

29. (Withdrawn): The method according to any one of claims 21, 22, 23, 24, 25, 26 or 27 wherein the CW laser beam is a YAG laser beam.

Applicant : Kusumoto, et al.  
Serial No. : 09/941,367  
Filed : August 28, 2001  
Page : 12 of 15

Attorney's Docket No.: 07977-  
010005 / US2941D1D1D1

30. (Withdrawn): The method according to any one of claims 21, 22, 23, 24, 25, 26 or 27 wherein said semiconductor layer is melted by the irradiation of the laser beam.